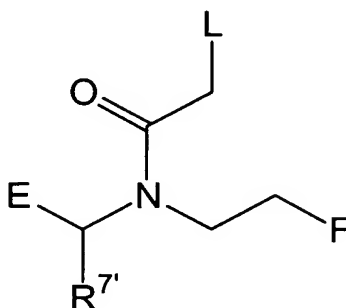


This listing of claims will replace all prior versions, and listings, of claims in the application.

**Listing of Claims:**

1-7 (canceled)

8 (currently amended). The compound of claim 34 + having the formula:



wherein:

L is selected from the group consisting of the nucleobases thymine, adenine, cytosine, guanine, uracil, 5-methylcytosine, 6-thioguanine, 7-deazaguanine, 7-deaza-8-azaguanine, 2,6-diaminopurine, 5-bromouracil, and protected derivatives; thereof:

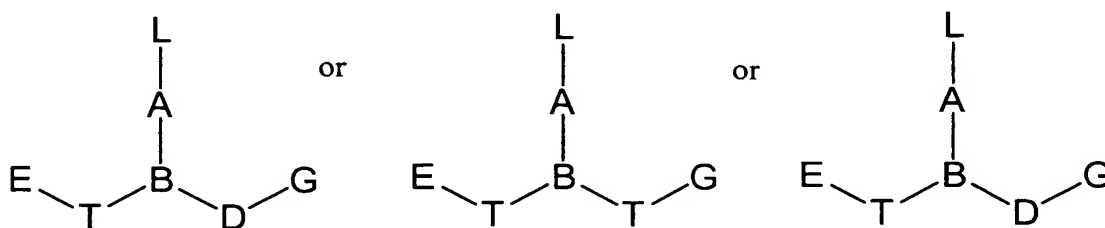
R<sup>7'</sup> is hydrogen;

E is SOOH or SO<sub>2</sub>OH ~~COOH~~ or an activated or protected derivative thereof; and

F is NH<sub>2</sub> or NHPg, where Pg is an amino protecting group.

9-33 (canceled)

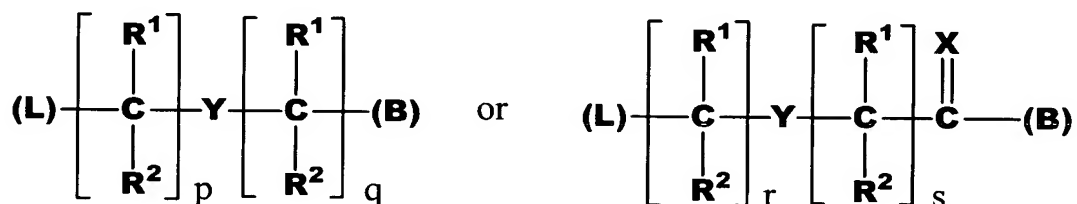
34 (new). A compound having one of the following formulas:



wherein:

L is a naturally occurring nucleobase, a non-naturally occurring nucleobase, a DNA intercalator, or a nucleobase binding group, and amino groups are, optionally protected by amino protecting groups;

A is a single bond or a group of the formula:



where:

X is O, S, Se, NR<sup>3</sup>, CH<sub>2</sub> or C(CH<sub>3</sub>)<sub>2</sub>;

Y is: a single bond, O or S when s is zero; or

a single bond, O, S or NR<sup>4</sup> when s is an integer from 1 to 5;

each of p and q is zero or an integer from 1 to 5, the sum of p+q being not more than 10;

each of r and s is zero or an integer from 1 to 5, the sum of r+s being not more than 10;

each R<sup>1</sup> and R<sup>2</sup> is independently selected from the group consisting of hydrogen, (C<sub>1</sub>-C<sub>4</sub>)alkyl, hydroxy- or alkoxy- or alkylthio-substituted (C<sub>1</sub>-C<sub>4</sub>)alkyl, hydroxy, alkoxy, alkylthio, amino and halogen; and

each R<sup>3</sup> and R<sup>4</sup> is independently selected from the group consisting of hydrogen, (C<sub>1</sub>-C<sub>4</sub>)alkyl, hydroxy- or alkoxy- or alkylthio-substituted (C<sub>1</sub>-C<sub>4</sub>)alkyl, hydroxy, alkoxy, alkylthio and amino;

B is N or R<sup>3</sup>N<sup>+</sup>, where R<sup>3</sup> is defined above;

each T is CR<sup>6</sup>R<sup>7</sup>, CHR<sup>6</sup>CHR<sup>7</sup> or CR<sup>6</sup>R<sup>7</sup>CH<sub>2</sub>, wherein R<sup>6</sup> is hydrogen and R<sup>7</sup> is selected from the group consisting of the side chains of naturally occurring alpha amino acids other than lysine, or R<sup>6</sup> and R<sup>7</sup> are independently selected from the group consisting of hydrogen, (C<sub>2</sub>-C<sub>6</sub>)alkyl, aryl, aralkyl, heteroaryl, hydroxy, (C<sub>1</sub>-C<sub>6</sub>)alkoxy, (C<sub>1</sub>-C<sub>6</sub>)alkylthio, NR<sup>3</sup>R<sup>4</sup> and SR<sup>5</sup>, where R<sup>3</sup> and R<sup>4</sup> are as defined above, and R<sup>5</sup> is hydrogen or (C<sub>1</sub>-C<sub>6</sub>)alkyl, hydroxy-, alkoxy-, or alkylthio- substituted (C<sub>1</sub>-C<sub>6</sub>)alkyl, or R<sup>6</sup> and R<sup>7</sup> taken together complete an alicyclic or heterocyclic system;

D is CR<sup>6</sup>R<sup>7</sup>, CH<sub>2</sub>CR<sup>6</sup>R<sup>7</sup> or CHR<sup>6</sup>CHR<sup>7</sup>, where R<sup>6</sup> and R<sup>7</sup> are as defined above;

each E is, independently SOOH or SO<sub>2</sub>OH, or an activated or protected derivative thereof; and

each G is, independently, NHR<sup>3</sup> or NPgR<sup>3</sup>, where R<sup>3</sup> is as defined above, and Pg is an amino protecting group.

35 (new). The compound of claim 34 wherein L is a naturally occurring nucleobase or a non-naturally occurring nucleobase.

36 (new). The compound of claim 8, wherein Pg is *tert*butyloxycarbonyl or 9-fluorenylmethoxycarbonyl.

37 (new). The compound of claim 8, wherein L is thymine.

38 (new). The compound of claim 37, wherein Pg is *tert*-butoxycarbonyl or 9-fluorenylmethoxycarbonyl.

39 (new). The compound of claim 8, wherein L is adenine or a protected derivative thereof.

40 (new). The compound of claim 39, wherein Pg is *tert*-butoxycarbonyl or 9-fluorenylmethoxycarbonyl.

41 (new). The compound of claim 40, wherein Pg is *tert*-butoxonyl and adenine is protected with a benzyloxycarbonyl protecting group.

42 (new). The compound of claim 8, wherein L is cytosine of a protected derivative thereof.

43 (new). The compound of claim 42, wherein Pg is *tert*-butoxycarbonyl or 9-fluorenylmethoxycarbonyl.

44 (new). The compound of claim 8, wherein L is guanine or a protected derivative thereof.

45 (new). The compound of claim 44, wherein Pg is *tert*-butoxycarbonyl or 9-fluorenylmethoxycarbonyl.

46 (new). The compound of claim 8, wherein L is uracil.

47 (new). The compound of claim 46, wherein Pg is *tert*-butoxycarbonyl or 9-fluorenylmethoxycarbonyl.

48 (new). The compound of claim 8, wherein L is 5-methylcytosine or a protected derivative thereof.

49 (new). The compound of claim 48, wherein Pg is *tert*-butoxycarbonyl or 9-fluorenylmethoxycarbonyl.

50 (new). The compound of claim 8, wherein L is 6-thioguanine or a protected derivative thereof.

51 (new). The compound of claim 50, wherein Pg is *tert*-butoxycarbonyl or 9-fluorenylmethoxycarbonyl.

52 (new). The compound of claim 8, wherein L is 7-deazaguanine or a protected derivative thereof.

53 (new). The compound of claim 52, wherein Pg is *tert*-butoxycarbonyl or 9-fluorenylmethoxycarbonyl.

54 (new). The compound of claim 8, wherein L is 7-deaza,8-azaguanine or a protected derivative thereof.

55 (new). The compound of claim 54, wherein Pg is *tert*-butoxycarbonyl or 9-fluorenylmethoxycarbonyl.

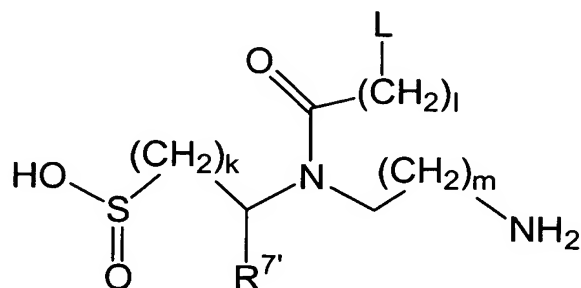
56 (new). The compound of claim 8, wherein L is 2,6-diaminopurine or a protected derivative thereof.

57 (new). The compound of claim 56, wherein Pg is *tert*-butoxycarbonyl or 9-fluorenylmethoxycarbonyl.

58 (new). The compound of claim 8, wherein L is 5-bromouracil.

59 (new). The compound of claim 58, wherein Pg is *tert*-butoxycarbonyl or 9-fluorenylmethoxycarbonyl.

60 (new). The compound of claim 34 having the formula:



wherein:

L is selected from the group consisting of heterocyclic moieties, naturally occurring nucleobases, and non-naturally occurring nucleobases;

R<sup>7'</sup> is selected from the group consisting of hydrogen and the side chains of naturally occurring alpha amino acids other than lysine;

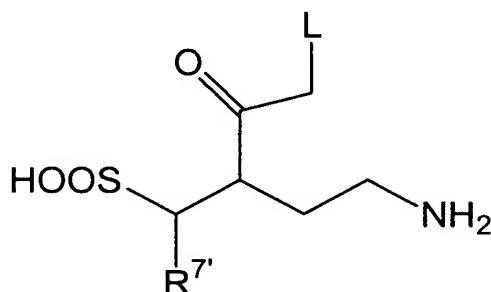
l is zero or an integer from 1 to 5; and

k and m are, independently, zero or 1.

61 (new). The compound of claim 60, wherein R<sup>7'</sup> is hydrogen.

62 (new). The compound of claim 61, wherein L is a naturally occurring nucleobase or a non-naturally occurring nucleobase.

63 (new). A monomer synthon having the formula:



wherein R<sup>7'</sup> is selected from the group consisting of hydrogen and the side chains of naturally occurring amino acids other than lysine and L is selected from the group consisting of thymine, adenine, cytosine, guanine and uracil, and said monomer synthon having one of amino-protection, acid terminal activation or both amino protection and acid terminal activation.

64 (new). The monomer synthon of claim 63, wherein L is adenine or a protected derivative thereof.

65 (new). The monomer synthon of claim 63, wherein L is guanine or a protected derivative thereof.

66 (new). The monomer synthon of claim 63, wherein L is thymine.

67 (new). The monomer synthon of claim 63, wherein L is cytosine or a protected derivative thereof.

68 (new). The monomer synthon of claim 63, wherein L is uracil.

69 (new). The monomer synthon of claim 63, wherein R<sup>7'</sup> is hydrogen.

70 (new). The monomer synthon of claim 63, wherein  $R^{7'}$  is the side chain of a naturally occurring alpha amino acid other than lysine.

71 (new). The monomer synthon of claim 69, wherein L is adenine or a protected derivative thereof.

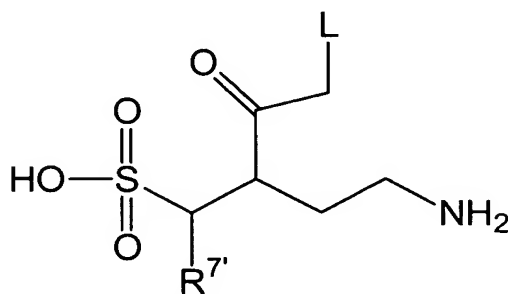
72 (new). The monomer synthon of claim 69, wherein L is guanine or a protected derivative thereof.

73 (new). The monomer synthon of claim 69, wherein L is thymine.

74 (new). The monomer synthon of claim 69, wherein L is cytosine or a protected derivative thereof.

75 (new). The monomer synthon of claim 69, wherein L is uracil.

76 (new). A monomer synthon having the formula:



wherein  $R^{7'}$  is selected from the group consisting of hydrogen and the side chains of naturally occurring amino acids other than lysine and L is selected from the group consisting of thymine, adenine, cytosine, guanine and uracil, and said monomer synthon having one of amino-protection, acid terminal activation or both amino protection and acid terminal activation.

77 (new). The monomer synthon of claim 76, wherein L is adenine or a protected derivative thereof.

78 (new). The monomer synthon of claim 76, wherein L is guanine or a protected derivative thereof.

79 (new). The monomer synthon of claim 76, wherein L is thymine.

80 (new). The monomer synthon of claim 76, wherein L is cytosine or a protected derivative thereof.

81 (new). The monomer synthon of claim 76, wherein L is uracil.

82 (new). The monomer synthon of claim 76, wherein R<sup>7'</sup> is hydrogen.

83 (new). The monomer synthon of claim 76, wherein R<sup>7'</sup> is the side chain of a naturally occurring alpha amino acid other than lysine.

84 (new). The monomer synthon of claim 82, wherein L is adenine or a protected derivative thereof.

85 (new). The monomer synthon of claim 82, wherein L is guanine or a protected derivative thereof.

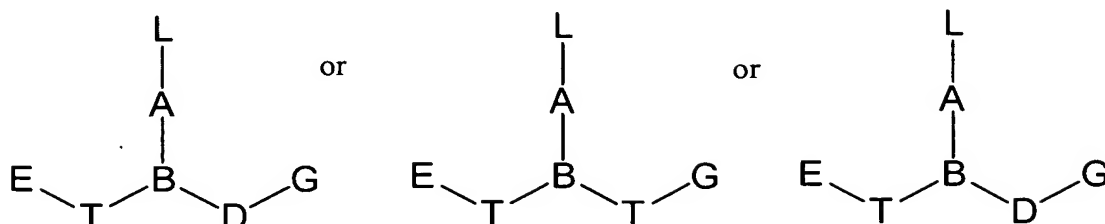
86 (new). The monomer synthon of claim 82, wherein L is thymine.

87 (new). The monomer synthon of claim 82, wherein L is cytosine or a protected derivative thereof.

88 (new). The monomer synthon of claim 82, wherein L is uracil.

89 (new). A compound having one of the following formulas:

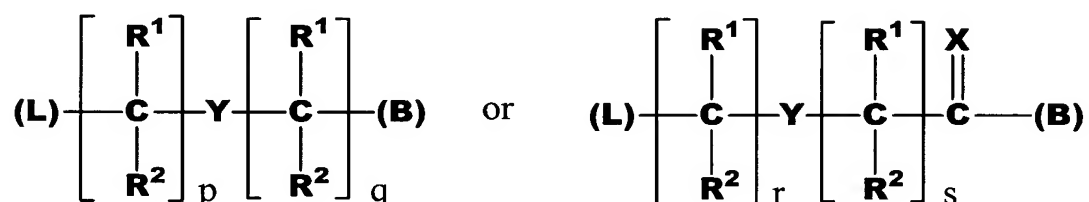




wherein:

L is a purine nucleobase and amino groups are, optionally protected by amino protecting groups;

A is a single bond or a group of the formula:



where:

X is O, S, Se, NR<sup>3</sup>, CH<sub>2</sub> or C(CH<sub>3</sub>)<sub>2</sub>;

Y is: a single bond, O or S when s is zero; or

a single bond, O, S or NR<sup>4</sup> when s is an integer from 1 to 5;

each of p and q is zero or an integer from 1 to 5, the sum of p+q being not more than 10;

each of r and s is zero or an integer from 1 to 5, the sum of r+s being not more than 10;

each R<sup>1</sup> and R<sup>2</sup> is independently selected from the group consisting of hydrogen, (C<sub>1</sub>-C<sub>4</sub>)alkyl, hydroxy- or alkoxy- or alkylthio-substituted (C<sub>1</sub>-C<sub>4</sub>)alkyl, hydroxy, alkoxy, alkylthio, amino and halogen; and

each R<sup>3</sup> and R<sup>4</sup> is independently selected from the group consisting of hydrogen, (C<sub>1</sub>-C<sub>4</sub>)alkyl; hydroxy- or alkoxy- or alkylthio-substituted (C<sub>1</sub>-C<sub>4</sub>)alkyl, hydroxy, alkoxy, alkylthio and amino;

B is N or R<sup>3</sup>N<sup>+</sup>, where R<sup>3</sup> is defined above;

each T is  $CR^6R^7$ ,  $CHR^6CHR^7$  or  $CR^6R^7CH_2$ , wherein  $R^6$  is hydrogen and  $R^7$  is selected from the group consisting of the side chains of naturally occurring alpha amino acids other than lysine, or  $R^6$  and  $R^7$  are independently selected from the group consisting of hydrogen,  $(C_2-C_6)$ alkyl, aryl, aralkyl, heteroaryl, hydroxy,  $(C_1-C_6)$ alkoxy,  $(C_1-C_6)$ alkylthio,  $NR^3R^4$  and  $SR^5$ , where  $R^3$  and  $R^4$  are as defined above, and  $R^5$  is hydrogen or  $(C_1-C_6)$ alkyl, hydroxy-, alkoxy-, or alkylthio- substituted  $(C_1-C_6)$ alkyl, or  $R^6$  and  $R^7$  taken together complete an alicyclic or heterocyclic system;

D is  $CR^6R^7$ ,  $CH_2CR^6R^7$  or  $CHR^6CHR^7$ , where  $R^6$  and  $R^7$  are as defined above;

each E is, independently SOOH or  $SO_2OH$ , or an activated or protected derivative thereof; and

each G is, independently,  $NHR^3$  or  $NPgR^3$ , where  $R^3$  is as defined above, and Pg is an amino protecting group.

90 (new). The compound of claim 89, wherein L is adenine or a protected derivative thereof.

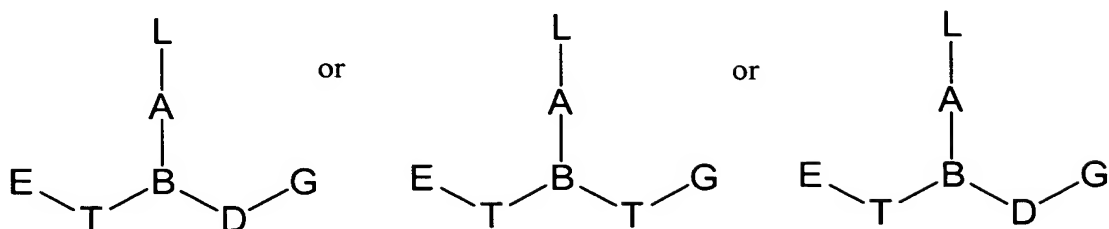
91 (new). The compound of claim 89, wherein L is guanine or a protected derivative thereof.

92 (new). The compound of claim 89, wherein L is 6-thioguanine or a protected derivative thereof.

93 (new). The compound of claim 89, wherein L is 7-deazaguanine or a protected derivative thereof.

94 (new). The compound of claim 89, wherein L is 7-deaza,8-azaguanine or a protected derivative thereof.

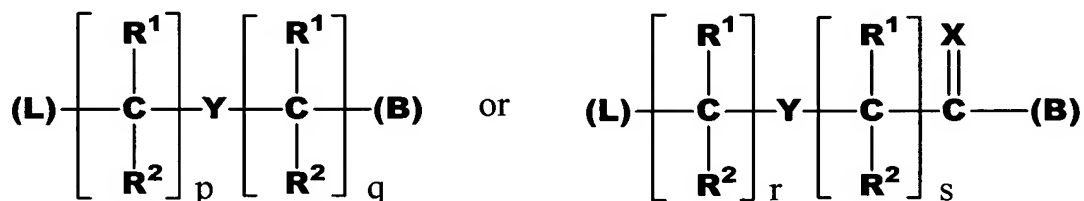
95 (new). A compound having one of the following formulas:



wherein:

L is a pyrimidine nucleobase and amino groups are, optionally protected by amino protecting groups;

A is a single bond or a group of the formula:



where:

X is O, S, Se, NR<sup>3</sup>, CH<sub>2</sub> or C(CH<sub>3</sub>)<sub>2</sub>;

Y is: a single bond, O or S when s is zero; or

a single bond, O, S or NR<sup>4</sup> when s is an integer from 1 to 5;

each of p and q is zero or an integer from 1 to 5, the sum of p+q being not more than 10;

each of r and s is zero or an integer from 1 to 5, the sum of r+s being not more than 10;

each R<sup>1</sup> and R<sup>2</sup> is independently selected from the group consisting of hydrogen, (C<sub>1</sub>-C<sub>4</sub>)alkyl, hydroxy- or alkoxy- or alkylthio-substituted (C<sub>1</sub>-C<sub>4</sub>)alkyl, hydroxy, alkoxy, alkylthio, amino and halogen; and

each R<sup>3</sup> and R<sup>4</sup> is independently selected from the group consisting of hydrogen, (C<sub>1</sub>-C<sub>4</sub>)alkyl, hydroxy- or alkoxy- or alkylthio-substituted (C<sub>1</sub>-C<sub>4</sub>)alkyl, hydroxy, alkoxy, alkylthio and amino;

B is N or R<sup>3</sup>N<sup>+</sup>, where R<sup>3</sup> is defined above;

each T is CR<sup>6</sup>R<sup>7</sup>, CHR<sup>6</sup>CHR<sup>7</sup> or CR<sup>6</sup>R<sup>7</sup>CH<sub>2</sub>, wherein R<sup>6</sup> is hydrogen and R<sup>7</sup> is selected from the group consisting of the side chains of naturally occurring alpha amino acids other than lysine, or R<sup>6</sup> and R<sup>7</sup> are independently selected from the group

consisting of hydrogen, (C<sub>2</sub>-C<sub>6</sub>)alkyl, aryl, aralkyl, heteroaryl, hydroxy, (C<sub>1</sub>-C<sub>6</sub>)alkoxy, (C<sub>1</sub>-C<sub>6</sub>)alkylthio, NR<sup>3</sup>R<sup>4</sup> and SR<sup>5</sup>, where R<sup>3</sup> and R<sup>4</sup> are as defined above, and R<sup>5</sup> is hydrogen or (C<sub>1</sub>-C<sub>6</sub>)alkyl, hydroxy-, alkoxy-, or alkylthio- substituted (C<sub>1</sub>-C<sub>6</sub>)alkyl, or R<sup>6</sup> and R<sup>7</sup> taken together complete an alicyclic or heterocyclic system;  
D is CR<sup>6</sup>R<sup>7</sup>, CH<sub>2</sub>CR<sup>6</sup>R<sup>7</sup> or CHR<sup>6</sup>CHR<sup>7</sup>, where R<sup>6</sup> and R<sup>7</sup> are as defined above;  
each E is, independently SOOH or SO<sub>2</sub>OH, or an activated or protected derivative thereof; and  
each G is, independently, NHR<sup>3</sup> or NPgR<sup>3</sup>, where R<sup>3</sup> is as defined above, and Pg is an amino protecting group.

96 (new). The compound of claim 95, wherein L is thymine.

97 (new). The compound of claim 95 wherein L is cytosine of a protected derivative thereof.

98 (new). The compound of claim 95, wherein L is uracil.

99 (new). The compound of claim 95, wherein L is 5-methylcytosine or a protected derivative thereof.

100 (new). The compound of claim 95, wherein L is 5-bromouracil.